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(12) **United States Patent**
Gustine et al.

(10) **Patent No.:** **US 6,897,377 B2**
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(54) **CLAMPING RECEPTACLE**

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patent is extended or adjusted under 35
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(21) Appl. No.: **09/919,006**

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(51) **Int. Cl.⁷** **H05K 5/00**

(52) **U.S. Cl.** **174/52.1**; 361/796

(58) **Field of Search** 174/52.1, 50.5;
361/627, 633, 641, 658, 736, 728, 752,
754, 796, 797, 798

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,737,579 A	3/1956	Wehrlin et al.	
2,796,559 A	6/1957	Fleucht	
2,833,966 A	5/1958	Goodier et al.	
2,876,277 A	3/1959	Badger et al.	
3,087,095 A	4/1963	McConkey, Jr. et al.	
3,135,321 A	6/1964	Butt et al.	
3,366,171 A	1/1968	Scharli	
3,467,891 A	9/1969	Mogle	
3,487,267 A	12/1969	Winston et al.	
3,697,929 A *	10/1972	Konewko et al.	439/260
3,767,974 A *	10/1973	Donovan et al.	361/798
3,809,798 A	5/1974	Simon	
3,997,819 A	12/1976	Eggert et al.	
4,172,212 A	10/1979	Heinzer	
4,184,539 A	1/1980	Rein	
4,259,843 A	4/1981	Kausch	

4,301,494 A *	11/1981	Jordan	361/798
4,449,576 A	5/1984	Baum et al.	
4,528,615 A	7/1985	Perry	
4,547,833 A	10/1985	Sharp	
4,559,790 A	12/1985	Houston	
4,564,061 A	1/1986	Rauth et al.	
4,656,559 A	4/1987	Fathi	
4,662,002 A	4/1987	Davis et al.	
4,679,250 A	7/1987	Davis et al.	
4,777,561 A	10/1988	Murphy et al.	

(Continued)

FOREIGN PATENT DOCUMENTS

EP	1 041 002	10/2000
GB	2 193 552	2/1988
JP	58-634	1/1983

(Continued)

OTHER PUBLICATIONS

Gary Gustine et al., U.S. Appl. No. 09/804,129, "Mechanical
Housing", filed Mar. 12, 2001.

(Continued)

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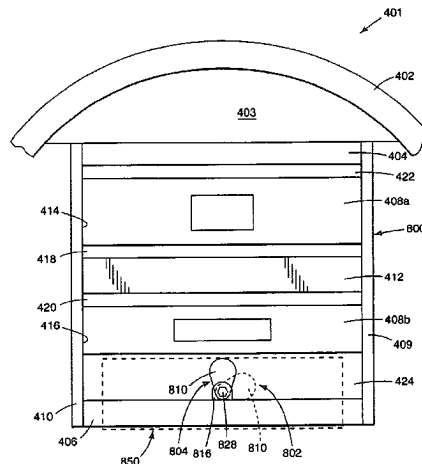
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(57)

ABSTRACT

A receptacle for confining circuit cards to different locations within a housing and that has a frame is provided. The frame has an array of slots, each containing one of the circuit cards. In one embodiment, the receptacle has a cam that is selectively engageable with the frame for clamping the circuit cards within the frame. In another embodiment, a shaft is rotatably attached to the receptacle. The shaft has a head at one end and a nut opposite the head. A resilient element is disposed on the shaft between the head and the nut. The resilient element is axially compressible between the head and nut to bulge generally perpendicularly to the axial direction into engagement with the frame for clamping the circuit cards within the frame.

39 Claims, 17 Drawing Sheets



U.S. PATENT DOCUMENTS

4,805,482 A * 2/1989 Boda 74/571 M
 4,815,913 A * 3/1989 Hata et al. 29/729
 4,849,858 A 7/1989 Grapes et al.
 4,858,068 A 8/1989 Bittler et al.
 4,858,070 A * 8/1989 Buron et al. 361/695
 4,909,752 A * 3/1990 Hallum et al. 361/752
 4,953,058 A 8/1990 Harris
 4,962,444 A 10/1990 Niggemann
 4,962,445 A 10/1990 Pelet et al.
 4,987,978 A * 1/1991 Jungersen 188/2 F
 5,019,939 A 5/1991 Reimer
 5,045,971 A 9/1991 Ono et al.
 5,048,793 A * 9/1991 Mefford et al. 254/29 R
 5,089,935 A 2/1992 Ito
 5,105,337 A 4/1992 Bittler et al.
 5,267,122 A 11/1993 Glover et al.
 5,309,315 A 5/1994 Naedel et al.
 5,329,425 A 7/1994 Leyssens et al.
 5,337,218 A * 8/1994 Cipolla et al. 361/785
 5,398,164 A * 3/1995 Goodman et al. 361/752
 5,424,916 A 6/1995 Martin
 5,432,682 A 7/1995 Giehl et al.
 5,519,573 A * 5/1996 Cobb et al. 361/686
 5,642,264 A 6/1997 Cantrell
 5,822,196 A * 10/1998 Hastings et al. 361/801
 5,825,621 A 10/1998 Giannatto et al.
 5,842,514 A 12/1998 Zapach et al.
 5,896,268 A 4/1999 Beavers
 5,923,531 A * 7/1999 Bachman et al. 361/690
 5,946,193 A 8/1999 Hendrix et al.
 5,995,378 A * 11/1999 Farnworth et al. 361/796
 6,002,588 A 12/1999 Vos et al.
 6,038,129 A 3/2000 Falaki et al.
 6,045,140 A 4/2000 Morris, Jr.
 6,104,611 A 8/2000 Glover et al.
 6,118,662 A 9/2000 Hutchison et al.
 6,151,213 A * 11/2000 Ater et al. 361/695
 6,209,631 B1 4/2001 Garcia-Ortiz
 6,289,678 B1 9/2001 Pandolfi
 6,292,361 B1 * 9/2001 Johnson et al. 361/687
 6,292,556 B1 9/2001 Laetsch
 6,295,208 B1 * 9/2001 Murchison et al. 361/759

6,310,772 B1 10/2001 Hutchinson et al.
 6,381,146 B1 * 4/2002 Sevier 361/754
 6,396,691 B1 5/2002 Pagnozzi
 6,404,637 B2 6/2002 Hutchison et al.
 6,406,312 B1 * 6/2002 Heitkamp 439/160
 6,421,252 B1 * 7/2002 White et al. 361/797
 6,430,044 B2 8/2002 Hutchinson et al.
 6,493,236 B1 * 12/2002 Momiyama et al. 361/756
 6,496,385 B1 * 12/2002 Smithson et al. 361/801
 6,510,223 B2 1/2003 Laetsch
 6,535,603 B2 3/2003 Laetsch
 6,587,339 B1 7/2003 Daniels et al.
 6,611,426 B2 8/2003 Hutchison et al.

FOREIGN PATENT DOCUMENTS

JP 58-105187 7/1983
 JP 60 79834 5/1985
 JP 60-26936 2/1987
 JP 62-67936 3/1987
 JP 62-79404 4/1987
 JP 2-4287 1/1990
 JP 2-166798 6/1990
 JP 7-177645 7/1995
 JP 8-65868 3/1996

OTHER PUBLICATIONS

Abacon Telecommunications, HDSL Low Capacity Repeater Case, 1 pg., date unknown.
 Abacon Telecommunications, HDSL High Capacity Repeater Case, 2 pgs., date unknown.
 "Hardened Telecom Enclosures for Optimal Thermal Management of Electronics", SPC TelEquip, pgs. 1-20, date unknown.
 Seri Lee, "How to Select a Heat Sink," Electronics Cooling, 9 pgs., Oct. 6, 2000.
 Joe Ricke Sr., "Managing Heat in Electronic Enclosures," Electronic Packaging & Production, pp. 87-88, 90, 92, vol. 36, No. 2, Feb. 1996.
 Circa Enterprises, Inc. "Digital Repeater Housings—HDSL Repeater", 2 pgs., 2000.
 Circa Enterprises, Inc., "Digital Repeater Housings—T1 Repeater", 2 pgs., 2000.

* cited by examiner

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2000 has two compartments **2002** that are closed by covers **2004**. Each of compartments **2002** receives a case **1800**, as shown in FIG. **20**, which, in one embodiment, is thermally coupled to housing **2000**, as described in U.S. patent application Ser. No. 09/804,129, entitled MECHANICAL HOUSING, which application is incorporated herein by reference.

CONCLUSION

Embodiments of the present invention have been described. The embodiments provide cases that clamp circuit cards within them to improve the thermal contact between the circuit cards and the cases, thereby reducing the risk of thermal failure.

Although specific embodiments have been illustrated and described in this specification, it will be appreciated by those of ordinary skill in the art that any arrangement that is calculated to achieve the same purpose may be substituted for the specific embodiment shown. This application is intended to cover any adaptations or variations of the present invention. For example, although cam **810** is portrayed in the accompanying figures as being oval, cam **810** can also be circular, elliptical, or any suitable shape. Moreover, serrations **412**, as shown in FIG. **10**, can be eliminated from the curved surface of cam **810**, or serrations **412** can be of a material other than rubber, such as plastic, metal, or the like. Although resilient elements **1202** and **1204** are shown to be hollow cylinders in FIG. **13**, resilient elements **1202** and **1204** can have other geometries, such as cubes having apertures passing through them. Further, although cams **1611** are rotatably attached to end wall **1606**, as shown in FIG. **16**, and are rotatable into engagement with frame **1608**, cams **1611** can be rotatably attached to frame **1608** and can be rotated into engagement with end wall **1606**. Although cams **1825** are rotatably attached to frame **1808**, as shown in FIG. **18**, and are rotatable into engagement with frame **1809**, cams **1825** can be rotatably attached to frame **1809** and can be rotatable into engagement with frame **1808**.

What is claimed is:

1. A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

a frame comprising an array of adjustable slots, the frame being thermally coupled to the housing, each slot containing one of the circuit cards; and

a cam selectively engageable with the frame for clamping the circuit cards within the frame and thermally coupling the circuit cards to the frame.

2. The receptacle of claim 1, wherein the frame is partitioned into first and second sub-frames by a first partition and each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions.

3. The receptacle of claim 2, wherein the first sub-frame is movable relative to the second sub-frame and is in slidable contact with the receptacle.

4. The receptacle of claim 3, wherein the first partition is in slidable contact with the receptacle.

5. The receptacle of claim 4, wherein the cam is engageable with the first sub-frame for sliding the first sub-frame so that circuit cards that are in the first sub-frame contact the first partition and sliding the first partition into contact with the circuit cards of the second sub-frame to clamp the circuit cards contained in the slots of the first sub-frame between the first sub-frame and the first partition and the circuit cards contained in the slots of the second sub-frame between the first partition and the second sub-frame.

6. The receptacle of claim 1, wherein the cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

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7. The receptacle of claim 1, wherein the cam is disposed within the receptacle.

8. The receptacle of claim 1, wherein the cam is rotatably attached to the receptacle.

9. The receptacle of claim 1, wherein the cam is disposed on a shaft that rotates the cam into and out of engagement with the frame.

10. The receptacle of claim 1, wherein the cam comprises a curved surface comprising serrations.

11. The receptacle of claim 1, wherein the frame comprises a pair of frames, the cam attached to one of the pair of frames and selectively engageable with the other of the pair of frames for clamping the circuit cards within each of the pair of frames.

12. A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

at least one frame partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of adjustable slots by a plurality of second partitions, each adjustable slot containing one of the circuit cards, the at least one frame being thermally coupled to the housing; and

at least one cam selectively engageable with the first sub-frame to clamp the circuit cards within the at least one frame, wherein the circuit cards are further thermally coupled to the at least one frame when the at least one cam is engaged with the first sub-frame.

13. The receptacle of claim 12, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

14. The receptacle of claim 12, wherein the at least one cam is disposed within the receptacle.

15. The receptacle of claim 12, wherein the at least one cam is rotatably attached to the receptacle.

16. The receptacle of claim 12, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the first sub-frame.

17. The receptacle of claim 12, wherein the at least one cam comprises a curved surface comprising serrations.

18. The receptacle of claim 12, wherein the first sub-frame is movable relative to the second sub-frame and is in slidable contact with the receptacle.

19. The receptacle of claim 18, wherein the first partition is in slidable contact with the receptacle.

20. The receptacle of claim 19, wherein the at least one cam is engageable with the first sub-frame for sliding the first sub-frame so that circuit cards that are in the first sub-frame contact the first partition and sliding the first partition into contact with the circuit cards of the second sub-frame to clamp the circuit cards contained in the slots of the first sub-frame between the first sub-frame and the first partition and the circuit cards contained in the slots of the second sub-frame between the first partition and the second sub-frame.

21. A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

at least one frame thermally coupled to the housing partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of adjustable slots by a plurality of second partitions, each adjustable slot containing one of the circuit cards;

wherein the first sub-frame is movable relative to the second sub-frame and is in slidable contact with the receptacle;

wherein the first partition is in slidable contact with the receptacle; and

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at least one cam disposed within the receptacle and rotatably attached to the receptacle, the at least one cam selectively rotatable for selectively engaging the first sub-frame for sliding the first sub-frame so that circuit cards of the first sub-frame contact the first partition and sliding the first partition into contact with the circuit cards of the second sub-frame to clamp the circuit cards contained in the adjustable slots of the first sub-frame between the first sub-frame and the first partition and the circuit cards contained in the slots of the second sub-frame between the first partition and the second sub-frame, wherein the circuit cards are thermally coupled to the frame when the at least one cam is engaged to the first sub-frame.

22. The receptacle of claim 21, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

23. The receptacle of claim 21, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the first sub-frame.

24. A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

first and second frames thermally coupled to the housing each of the first and second frames partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of adjustable slots by a plurality of second partitions, each adjustable slot containing one of the circuit cards; and at least one cam disposed between the first and second frames, the at least one cam rotatably attached to the first frame and adapted to engage the second frame to exert a force on each of the first and second frames for clamping the circuit cards within the first and second frames and thermally coupling the circuit cards to the first and second frames.

25. The receptacle of claim 24, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

26. The receptacle of claim 24, wherein the at least one cam is disposed on a shaft that is rotatably attached to the first frame, the shaft rotating the at least one cam into and out of engagement with the second frame.

27. The receptacle of claim 24, wherein the at least one cam comprises a curved surface comprising serrations.

28. The receptacle of claim 24, wherein the first sub-frame of each of the first and second frames is movable relative to the second sub-frame of each of the first and second frames and is in slidable contact with the receptacle.

29. The receptacle of claim 28, wherein the first partition of each of the first and second frames is in slidable contact with the receptacle.

30. The receptacle of claim 24, wherein the receptacle is thermally coupled to the housing.

31. A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

first and second frames, each of the first and second frames partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions, each slot containing one of the circuit cards; at least one cam disposed between the first and second frames, the at least one cam rotatably attached to the first frame and adapted to engage the second frame to exert a force on each of the first and second frames for clamping the circuit cards within the first and second frames;

wherein the first sub-frame of each of the first and second frames is movable relative to the second sub-frame of

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each of the first and second frames and is in slidable contact with the receptacle;

wherein the first partition of each of the first and second frames is in slidable contact with the receptacle; and

wherein the force exerted on the first and second frames slides the first sub-frame of each of the first and second frames so that circuit cards of the first sub-frame of each of the first and second frames contact the first partition of each of the first and second frames and slides the first partition of each of the first and second frames into contact with the circuit cards of the second sub-frame of each of the first and second frames to clamp the circuit cards contained in the slots of the first sub-frame of each of the first and second frames between the first sub-frame and the first partition of each of the first and second frames and the circuit cards contained in the slots of the second sub-frame of each of the first and second frames between the first partition and the second sub-frame of each of the first and second frames.

32. A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

first and second frames thermally coupled to the housing, each of the first and second frames partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of adjustable slots by a plurality of second partitions, each adjustable slot containing one of the circuit cards;

wherein the first sub-frame of each of the first and second frames is movable relative to the second sub-frame of each of the first and second frames and is in slidable contact with the receptacle;

wherein the first partition of each of the first and second frames is in slidable contact with the receptacle; and

at least one cam disposed between the first and second frames, the at least one cam rotatably attached to the first sub-frame of the first frame and is selectively rotatable for engaging the first sub-frame of the second frame to exert a force on the first sub-frame of each of the first and second frames to slide the first sub-frame of each of the first and second frames so that circuit cards of the first sub-frame of each of the first and second frames contact the first partition of each of the first and second frames and to slide the first partition of each of the first and second frames into contact with the circuit cards of the second sub-frame of each of the first and second frames to clamp the circuit cards contained in the slots of the first sub-frame of each of the first and second frames between the first sub-frame and the first partition of each of the first and second frames and the circuit cards contained in the slots of the second sub-frame of each of the first and second frames between the first partition and the second sub-frame of each of the first and second frames, wherein the circuit cards are thermally coupled to the first and second frames respectively when the at least one cam is engaged with the first sub-frame.

33. The receptacle of claim 32, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

34. The receptacle of claim 32, wherein the at least one cam is disposed on a shaft that is rotatably attached to the first sub-frame of the first frame, the shaft rotating the at least one cam into and out of engagement with the first sub-frame of the second frame.

35. The receptacle of claim 32, wherein the receptacle is thermally coupled to the housing.

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36. A receptacle for confining circuit boards, the receptacle comprising:

at least one frame thermally coupled to the housing, each frame having at least one adjustable slot, wherein the at least one adjustable slot is adapted to receive a circuit card;

at least one cam adapted to selectively apply force on the frame to adjust the size of the slot, wherein when the at least one cam applies a force on the frame, the size of the at least one adjustable slot is reduced to clamp a circuit card therein and thermally couple the circuit card to the frame.

37. The receptacle of claim **36**, wherein the at least one frame further comprises:

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two or more sub-frames, and

sliding partitions separating the two or more sub-frames.

38. The receptacle of claim **36**, wherein the at least one frame includes a first and second frame;

the first and second frames being received in the receptacle approximate each other; and

the at least one cam coupled to the first frame.

39. The receptacle of claim **36**, further comprising:

the at least one cam selectively engaging the second frame.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 6,897,377
APPLICATION NO. : 09/919,006
ISSUE DATE : 5/4/2005
INVENTOR(S) : Gustine, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Under Other Publications on the face of the issued patent, please add the following reference:
Su, "Case for Mounting Slidably a Data Storage Medium in a Computer Housing" US Patent Publication No. US 2002/0141153 A1, Filed 07/09/01, Published 10/03/2002.

At Claim 31, Column 13, Line 60, please replace "earn" with "cam"

MAILING ADDRESS OF SENDER(Please do not use customer number below):

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This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application for to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Applicants	Gustine et al.	COMMUNICATION REGARDING CERTIFICATE OF CORRECTION
Patent No.	6,897,377	
Issue Date	5/4/2005	
Serial No.	09/919,006	
Attorney Docket No.	100.216US01	
Title: CLAMPING RECEPTACLE		

ATTN: Certificate of Corrections Branch
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Applicants hereby request issuance of a Certificate of Correction in U.S. Letters Patent No. 6,897,377 as specified on the attached Certificate (Form PTO/SB/44). Please find enclosed documentation supporting errors identified in the above noted patent, referred to herein as Exhibits A, B and C. Exhibit A is a copy of the face and the claims of the issued patent.

With respect to the error identified on the face of the issued patent, Exhibit B comprises a copy of a supplemental IDS Form PTO-1449 acknowledged as received in the U.S. Patent & Trademark Office on January 12, 2004 and reviewed by the Examiner on August 7, 2004.

With respect to the error identified in claim 31 of the issued patent, Exhibit C comprises an amended listing of claims, including claim 31 of the issued patent, from pages 1-13 of an Amendment and Response filed with the U.S. Patent & Trademark Office under 37 CFR § 1.116 on November 8, 2004. The identified error constitutes a typographical error, and, as such, does not introduce new matter.

Applicants believe these corrections as specified are due to Office errors and therefore does not believe that any fee is due for issuance of a Certificate of Correction. However, if deemed necessary, the Office is authorized to charge any additional fees found due to Deposit Account No. 502432. Please contact the undersigned if there are any further questions.

COMMUNICATION REGARDING CERTIFICATE OF CORRECTION

PAGE 2

Serial No. 09/919,006

Attorney Docket No. 100.216US01

Issue Date: 5/4/2005

Title: CLAMING RECEPTACLE

Respectfully submitted,

Date: August 29, 2007

/David D. Freitag/

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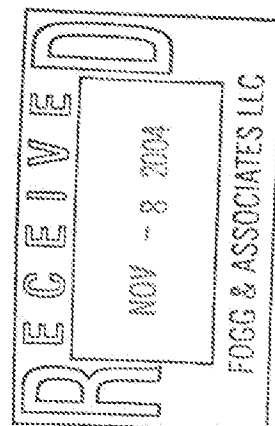
Applicant(s)	Gary Gustine	FACSIMILE TRANSMITTAL FORM
Serial No.	09/919,006	
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Group Art Unit	2831	
Examiner Name	Adolfo Nino	
Facsimile No.	703-872-9306	
Confirmation No.	3212	
Attorney Docket No.	100.216US01	
Title: CLAMPING RECEPACLE		

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<input checked="" type="checkbox"/> An Amendment and Response under 37 CFR 1.116 (13 pgs.).			
Please charge any additional fees or credit any overpayments to Deposit Account No. 502432.			
Submitted By			
Name	Scott Lindberg	Reg. No.	51,899
Signature		Telephone	(612) 332-4730
		Date	November 8, 2004
Attorneys for Applicant Fogg & Associates, LLC P.O. Box 581339 Minneapolis, MN 55458-1339 T: 612-332-4730 F: 612-332-4731			
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Name	Elizabeth A. Bauer	Signature	

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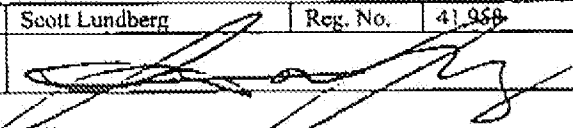
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Applicant(s)	Gary Gustine	FACSIMILE TRANSMITTAL FORM
Serial No.	09/919,006	
Filing Date	July 31, 2001	
Group Art Unit	2831	
Examiner Name	Adolfo Nino	
Facsimile No.	703-872-9306	
Confirmation No.	3212	
Attorney Docket No.	100.216US01	
Title: CLAMPING RECEPTACLE		

TOTAL PAGES: 14 pgs. (including cover sheet)**TO CENTRAL FAX - (703) 872-9306****Attention: Examiner Adolfo Nino, Art Unit 2831**

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 Alexandria, VA 22313-1450

Enclosures					
The following documents are enclosed:					
<input checked="" type="checkbox"/> An Amendment and Response under 37 C.F.R. 1.116 (13 pgs.).					
Please charge any additional fees or credit any overpayments to Deposit Account No. 502432.					
Submitted By					
Name	Scott Lundberg	Reg. No.	41,958	Telephone	(612) 332-4720
Signature				Date	November 8, 2004
Attorneys for Applicant Fogg & Associates, LLC P.O. Box 581339 Minneapolis, MN 55458-1339 T: 612-332-4720 F: 612-332-4731					
CUSTOMER NUMBER: 34206					
Certificate of Transmission					

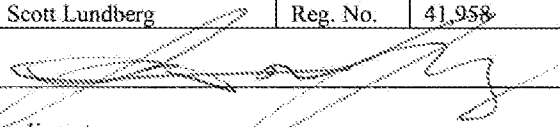
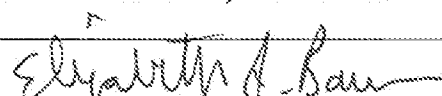
Applicant(s)	Gary Gustine	<p align="center">FACSIMILE TRANSMITTAL FORM</p>
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CUSTOMER NUMBER: 34206					
Certificate of Transmission					
I certify that this paper, and the above-identified documents, are being transmitted by facsimile to, Examiner Adolfo Nino, Group Art Unit 2831 (Facsimile No. 703-872-9306) of the United States Patent and Trademark Office on November 8, 2004.					
Name	Elizabeth A. Bauer		Signature		

Applicant(s)	Gustine	<p style="text-align: center;"><u>AMENDMENT</u> <u>AND RESPONSE</u> <u>UNDER 37 C.F.R. § 1.116</u> <u>EXPEDITED</u> <u>EXAMINATION</u> <u>PROCEDURE</u></p>
Serial No.	09/919,006	
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Applicants have reviewed the Final Office Action mailed on August 11, 2004. Please amend the above-identified application as follows.

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 11 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of claims:

1. (Currently amended) A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

a frame comprising an array of slots, the frame being thermally coupled to the housing,
each slot containing one of the circuit cards; and

a cam selectively engageable with the frame for clamping the circuit cards within the frame and thermally coupling the circuit cards to the frame.
2. (Original) The receptacle of claim 1, wherein the frame is partitioned into first and second sub-frames by a first partition and each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions.
3. (Original) The receptacle of claim 2, wherein the first sub-frame is movable relative to the second sub-frame and is in slidable contact with the receptacle.
4. (Original) The receptacle of claim 3, wherein the first partition is in slidable contact with the receptacle.
5. (Original) The receptacle of claim 4, wherein the cam is engageable with the first sub-frame for sliding the first sub-frame so that circuit cards that are in the first sub-frame contact the first partition and sliding the first partition into contact with the circuit cards of the second sub-frame to clamp the circuit cards contained in the slots of the first sub-frame between

the first sub-frame and the first partition and the circuit cards contained in the slots of the second sub-frame between the first partition and the second sub-frame.

6. (Original) The receptacle of claim 1, wherein the cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

7. (Original) The receptacle of claim 1, wherein the cam is disposed within the receptacle.

8. (Original) The receptacle of claim 1, wherein the cam is rotatably attached to the receptacle.

9. (Original) The receptacle of claim 1, wherein the cam is disposed on a shaft that rotates the cam into and out of engagement with the frame.

10. (Original) The receptacle of claim 1, wherein the cam comprises a curved surface comprising serrations.

11. (Original) The receptacle of claim 1, wherein the frame comprises a pair of frames, the cam attached to one of the pair of frames and selectively engageable with the other of the pair of frames for clamping the circuit cards within each of the pair of frames.

12. (Currently Amended) A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

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at least one frame partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions, each slot containing one of the circuit cards, the at least one frame being thermally coupled to the housing; and

at least one cam selectively engageable with the first sub-frame to clamp the circuit cards within the at least one frame, wherein the circuit cards are further thermally coupled to the at least one frame when the at least one cam is engaged with the first sub-frame.

13. (Original) The receptacle of claim 12, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

14. (Original) The receptacle of claim 12, wherein the at least one cam is disposed within the receptacle.

15. (Original) The receptacle of claim 12, wherein the at least one cam is rotatably attached to the receptacle.

16. (Original) The receptacle of claim 12, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the first sub-frame.

17. (Original) The receptacle of claim 12, wherein the at least one cam comprises a curved surface comprising serrations.

18. (Original) The receptacle of claim 12, wherein the first sub-frame is movable relative to the second sub-frame and is in slidable contact with the receptacle.

19. (Original) The receptacle of claim 18, wherein the first partition is in slidable contact with the receptacle.

20. (Original) The receptacle of claim 19, wherein the at least one cam is engageable with the first sub-frame for sliding the first sub-frame so that circuit cards that are in the first sub-frame contact the first partition and sliding the first partition into contact with the circuit cards of the second sub-frame to clamp the circuit cards contained in the slots of the first sub-frame between the first sub-frame and the first partition and the circuit cards contained in the slots of the second sub-frame between the first partition and the second sub-frame.

21. (Currently amended) A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

at least one frame thermally coupled to the housing partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions, each slot containing one of the circuit cards;

wherein the first sub-frame is movable relative to the second sub-frame and is in slidable contact with the receptacle;

wherein the first partition is in slidable contact with the receptacle; and

at least one cam disposed within the receptacle and rotatably attached to the receptacle, the at least one cam selectively rotatable for selectively engaging the first sub-frame for sliding the first sub-frame so that circuit cards of the first sub-frame contact the first partition and sliding the first partition into contact with the circuit cards of the second sub-frame to clamp the circuit cards contained in the slots of the first sub-frame between the first sub-frame and the first partition and the circuit cards contained in the

slots of the second sub-frame between the first partition and the second sub-frame[.],
wherein the circuit cards are thermally coupled to the frame when the at least one cam is engaged to the first sub-frame.

22. (Original) The receptacle of claim 21, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

23. (Original) The receptacle of claim 21, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the first sub-frame.

24. (Currently Amended) A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

first and second frames thermally coupled to the housing, each of the first and second frames partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions, each slot containing one of the circuit cards; and

at least one cam disposed between the first and second frames, the at least one cam rotatably attached to the first frame and adapted to engage the second frame to exert a force on each of the first and second frames for clamping the circuit cards within the first and second frames and thermally coupling the circuit cards to the first and second frames.

25. (Original) The receptacle of claim 24, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

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26. (Original) The receptacle of claim 24, wherein the at least one cam is disposed on a shaft that is rotatably attached to the first frame, the shaft rotating the at least one cam into and out of engagement with the second frame.

27. (Original) The receptacle of claim 24, wherein the at least one cam comprises a curved surface comprising serrations.

28. (Original) The receptacle of claim 24, wherein the first sub-frame of each of the first and second frames is movable relative to the second sub-frame of each of the first and second frames and is in slidable contact with the receptacle.

29. (Original) The receptacle of claim 28, wherein the first partition of each of the first and second frames is in slidable contact with the receptacle.

30. (Currently amended) The receptacle of claim 29, A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

first and second frames, each of the first and second frames partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions, each slot containing one of the circuit cards;

at least one cam disposed between the first and second frames, the at least one cam rotatably attached to the first frame and adapted to engage the second frame to exert a force on each of the first and second frames for clamping the circuit cards within the first and second frames;

wherein the first sub-frame of each of the first and second frames is movable relative to the second sub-frame of each of the first and second frames and is in slidable contact with the receptacle;

wherein the first partition of each of the first and second frames is in slidable contact with the receptacle; and

wherein the force exerted on the first and second frames slides the first sub-frame of each of the first and second frames so that circuit cards of the first sub-frame of each of the first and second frames contact the first partition of each of the first and second frames and slides the first partition of each of the first and second frames into contact with the circuit cards of the second sub-frame of each of the first and second frames to clamp the circuit cards contained in the slots of the first sub-frame of each of the first and second frames between the first sub-frame and the first partition of each of the first and second frames and the circuit cards contained in the slots of the second sub-frame of each of the first and second frames between the first partition and the second sub-frame of each of the first and second frames.

31. (Original) The receptacle of claim 24, wherein the receptacle is thermally coupled to the housing.

32. (Currently Amended) A receptacle for confining circuit cards to different locations within a housing, the receptacle comprising:

first and second frames thermally coupled to the housing, each of the first and second frames partitioned into first and second sub-frames by a first partition, each of the first and second sub-frames partitioned into an array of slots by a plurality of second partitions, each slot containing one of the circuit cards;

wherein the first sub-frame of each of the first and second frames is movable relative to the second sub-frame of each of the first and second frames and is in slidable contact with the receptacle;

wherein the first partition of each of the first and second frames is in slidable contact with the receptacle; and

at least one cam disposed between the first and second frames, the at least one cam rotatably attached to the first sub-frame of the first frame and is selectively rotatable for engaging the first sub-frame of the second frame to exert a force on the first sub-frame of each of the first and second frames to slide the first sub-frame of each of the first and second frames so that circuit cards of the first sub-frame of each of the first and second frames contact the first partition of each of the first and second frames and to slide the first partition of each of the first and second frames into contact with the circuit cards of the second sub-frame of each of the first and second frames to clamp the circuit cards contained in the slots of the first sub-frame of each of the first and second frames between the first sub-frame and the first partition of each of the first and second frames and the circuit cards contained in the slots of the second sub-frame of each of the first and second frames between the first partition and the second sub-frame of each of the first and second frames[.],wherein the circuit cards are thermally coupled to the first and second frames respectfully when the at least one cam is engaged with the first sub-frame.

33. (Original) The receptacle of claim 32, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

34. (Original) The receptacle of claim 32, wherein the at least one cam is disposed on a shaft that is rotatably attached to the first sub-frame of the first frame, the shaft rotating the at least one cam into and out of engagement with the first sub-frame of the second frame.

35. (Original) The receptacle of claim 32, wherein the receptacle is thermally coupled to the housing.

Claims 36-106 (Cancelled)

107. (Previously presented) A receptacle for confining circuit boards, the receptacle comprising:

at least one frame thermally coupled to the housing, each frame having at least one adjustable slot, wherein the at least one adjustable slot is adapted to receive a circuit card;

at least one cam adapted to selectively apply force on the frame to adjust the size of the slot, wherein when the at least one cam applies a force on the frame, the size of the at least one adjustable slot is reduced to clamp a circuit card therein and thermally couple the circuit card to the frame.

108. (Previously presented) The receptacle of claim 107, wherein the at least one frame further comprises:

two or more sub-frames, and

sliding partitions separating the two or more sub-frames.

109. (Previously presented) The receptacle of claim 107, wherein the at least one frame includes a first and second frame;

the first and second frames being received in the receptacle approximate each other; and

the at least one cam coupled to the first frame.

110. (Previously presented) The receptacle of claim 107, further comprising:

the at least one cam selectively engaging the second frame.

REMARKS

Applicant has reviewed the Final Office Action mailed on August 11, 2004, as well as the art cited. Claims 1, 12, 21, 24, 30 and 32 are currently amended. Claims 1-35 and 107-110 are pending in this application.

Rejections Under 35 U.S.C. § 102

Claims 1-9, 11-16, 18-26, 28, 29 and 31-35 were rejected under 35 USC § 102(b) as being anticipated by Farnworth et al., (U.S. Patent No. 5,995,378).

Rejections Under 35 U.S.C. § 103

Claims 10, 17 and 27 were rejected under 35 USC § 103(a) as being unpatentable over Farnworth in view of Jungersen (U.S. Patent No. 4,987,978).

Allowable Subject Matter

Claims 107-110 were allowed.

Claim 30 was objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Telephonic Interview

Applicant thanks the Examiner for the telephonic interview on October 28, 2004. The Applicant discussed the rejected claims. In particular, the Applicant discussed possible amendments that could be made to the rejected claims to get them allowed so the application could issue into a patent. The content of the allowed claims was discussed and the Examiner stated that if the rejected independent claims were amended to include the limitations in the allowed claim (claim 107) those rejected claims would also be allowed. Accordingly, the Applicant has amended the remaining rejected independent claims to include the limitations of the allowed claim. In particular, the Applicant has amended Claims 1, 12, 21, 24 and 32 to include language regarding the frame being thermally coupled to the housing and the circuit

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cards being selectively thermally coupled to the frame. Therefore, the Applicant respectfully requests the withdrawal of the rejections of claims 1-29 and 31-35.

Applicant has further rewritten Claim 30 into an independent claim that includes all the limitation of its rejected base claim and intervening claims. As such the Applicant respectfully rejects the objection to Claim 30.

The Applicant has merely made the above amendments to get the case allowed. The Applicant, however, retains the right to file a continuation application having claims with a scope similar to those as originally filed.

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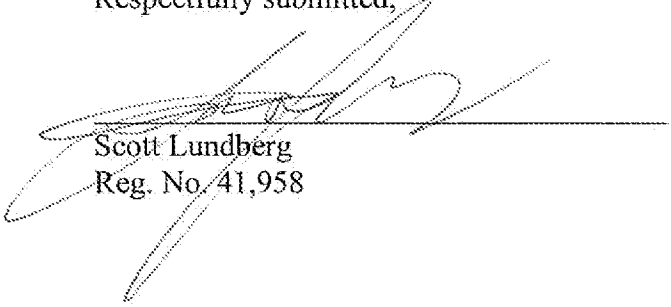
Title: CLAMPING RECEPTACLE

CONCLUSION

Applicant respectfully submits that claims 1-35 and 107-110 are in condition for allowance and notification to that effect is earnestly requested. If necessary, please charge any additional fees or credit overpayments to Deposit Account No. 502432.

If the Examiner has any questions or concerns regarding this application, please contact the undersigned at 612-455-1690.

Respectfully submitted,

Date: 10-8-04

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Applicant(s)	Gary Gustine et al.	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT FORM PTO-1449
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Attorney Docket No.	100.216US01	
Title: CLAMPING RECEPTACLE		
		Sheet 1 of 1

U.S. Patent References				
Examiner Initials	Patent No.	Issue Date	Name	Filing Date
AN	5,642,264	06/24/97	Cantrell	01/26/95
	5,825,621	10/20/98	Giannatto et al.	08/22/97
	5,946,193	08/31/99	Hendrix et al.	09/12/97
	6,430,044	08/06/02	Hutchinson et al.	02/12/01
	6,587,339	07/01/03	Daniels et al.	03/29/02
	6,611,426	08/26/03	Hutchinson et al.	04/22/02
	6,510,223	01/21/03	Laetsch	09/14/01
AN	6,535,603	03/18/03	Laetsch	02/08/01

Foreign Patent References				
Examiner Initials	Foreign Patent	Name	Publication Date	T?
	Country No.			
	NONE			

Other References	
Examiner Initials	Author, Title, Date, Pages, etc.
	Su, "Case for Mounting Slidably a Data Storage Medium in a Computer Housing" US Patent Publication No. US 2002/0141153 A1, Filed 07/09/01, Published 10/03/2002. (9 pgs.)

Examiner Signature		Date Considered	8-7-04
<small>*Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>			